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ABSTRACT

This doctoral dissertation examines the question of whether student classroom behavior influences teachers' classroom behavior, and if so, whether the direction of change is predictable, as has been suggested by previous research. The four hypotheses tested were: 1) There will be a significant change in teacher behavior when there is change in student behavior. 2) Teacher behavior will be significantly more positive during periods of positive rather than negative student behavior. 3) Teacher behavior will be significantly more positive during periods of positive rather than natural student behavior. 4) Teacher behavior will be significantly more positive during periods of natural rather than negative student behavior. Twenty-four college teachers were used as subjects and were not the assigned teacher of the 24 undergraduate and graduate education classes in which the experiment took place, nor did they know that an experiment was being conducted. Verbal and nonverbal aspects of teacher behavior were measured, using the Flanders Interaction Analysis instrument and the Visual Observational Schedule of Teacher Behaviors. These instruments, with the statistical analyses of observations, are included in the document. The results of all the analyses were consistent, supporting hypotheses one, two, and four, and not supporting hypothesis three. (MBM)

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by

Susan Shurberg Klein

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Education in the
Graduate School, Temple University.

1970

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CHAPTER I

INTRODUCTION TO THE PROBLEM

Interaction models imply that when two or more people form a relationship or interact, change in one affects the other. The teaching-learning process by its very nature implies such an interaction. Thus, it may be expected that teachers and students influence one another.

Two main approaches have been taken to investigate this relationship. The early research emphasis was placed on discovering which presage variables or teacher characteristics were related to student growth. (Morsh & Wilder, 1954). However, the results of these studies were unsuccessful in identifying stable relationships between teacher traits and change in student achievement or attitudes. Even the related studies which examined teacher characteristics failed to predict change in teacher behavior. (Soar, 1966; Trow, 1960; Wallen, Travers, Reid & Wodke, 1963).

The current emphasis of classroom behavior studies as reviewed by Amidon and Flanders (1967), Rosenshine (in press), and Flanders and Simon (1969) has been placed on examining the relationship of process variables, such as teacher classroom behavior, to student growth. While the results of these studies have been somewhat inconsistent, they appear to support a general trend that positive, or accepting and encouraging teacher behaviors are associated more frequently with student growth than are negative or rejecting and critical teacher behaviors.

Although most recent studies of classroom interaction were correlational and nonexperimental, the importance of the teacher's contributions to the classroom process and especially to the student's subsequent growth was stressed. Little attention was focused on student contributions to the total classroom climate or, in particular, to their teacher's subsequent behavior. However, recent successful use of the interactional approach in studies of teacher influence on student behavior indicates that the interactional approach may be helpful in predictions involving student influence on teacher behavior. Just as there may be some identifiable effective teacher behaviors that contribute to improved student achievement or attitudes, there may be such a thing as "pupil effectiveness," which means that students may be able to help their teachers improve their teaching behavior. To rephrase Turner's (1967, p.1) point, an important locus of control for a teacher's behavior may lie in the behavior of his students.

Since there is no direct evidence on whether certain student behaviors can promote specified positive or negative teacher behaviors, the present experimental study was designed to:

1. Ascertain whether or not student classroom behaviors influence teacher classroom behaviors at all; and if so,

2. To determine whether or not the direction of change toward positive or negative teacher behaviors could be predicted from specified positive or negative student behaviors.

Since little attention has been focused on students' influence on their teachers' behavior, it is necessary to examine related studies in both educational and social psychological research. Several researchers have discussed different ways in which students may contribute to the classroom climate or influence one another. J. Jackson (1960) and Cody (1966) discussed how students created norms which seemed to determine how the class functioned and which may have had positive or negative effects on the teacher. P. Jackson (1968) described various student strategies and pointed out some ways such as "apple polishing," "cheating," and "playing it cool" that students influenced each other and their teacher.

Kounin (1967) illustrated how student reaction contributed to the classroom climate by describing the "ripple effect" or Thorndike's "spread of effect" that occurs when a teacher disciplines a student and the other students also feel the effects. Gnagey (1960) linked the "ripple effect" and student influence on teacher behavior by showing that teachers received higher esteem from the class if a powerful member of the class submitted to the discipline, and lower esteem if the high power deviant resisted the discipline.

Other investigators have noted that teachers respond differently to different students. Jackson, Silberman and Wolfson (1969) found that teachers became more personally involved with boys than with girls, and with those students who were salient rather than nonsalient in the teacher's mind. They also found that teachers frequently attributed negative behaviors to boys rather than to girls. Feshbach (1969) concluded that student teachers placed higher values on children's rigid, dependent conforming behaviors than on children's flexible, independent and assertive behaviors. Gotts' (1967) analysis showed that teachers were irritated by students' socially disruptive or offensive acts. Such studies indicate that students and teachers both are aware of and react to different student behaviors in the classroom.

Another group of studies explored aspects of student influence on teachers by investigating the results of various types of student feedback to teachers. Most of these studies involved written student feedback. In an investigation using pre- and post-questionnaires of teacher self-perceptions and of student descriptions of their ideal teacher, Gage (1963) concluded that if a teacher learned how the students wanted him to behave, the teacher would become more like the students' ideal. Tuckman and Oliver (1968), using student ratings to determine changes in teacher behavior, found that teachers changed their behavior positively or according to the suggestions when receiving feedback from students and negatively when receiving feedback from supervisors. Ryan (1966) attempted to determine if the use of students' written feedback would change the amount of time during which the teachers talked and the amount of verbal or nonverbal reinforcement used by beginning secondary school teachers. He found no significant relationships and suggested that the lack of significance was due to the high percentage of positive student comments which probably encouraged the teachers not to change. These studies seemed to indicate that certain teacher responses were influenced by students' written feedback even though, as Ryan's study illustrated, they may not have changed their classroom behaviors.

A recent experimental study by Jenkins and Deno (1969) was designed to investigate how student classroom behaviors, rather than written feedback, influenced teachers' self-evaluations. The authors concluded that the teachers who received positive feedback from the student experimenters indicated that they found the teaching experience more enjoyable to themselves and profitable to the students, than did the teachers who received negative student feedback.

Some evidence in the literature indicates that classes as a whole, as well as individual students in the classes, may influence their teachers. Soar (1966), in a two year study using elementary teachers teaching different groups of students each year, noted a low stability of some teacher process scores such as indirect teaching and pupil physical freedom. Turner (1967) suggested that the low stability of these scores was associated with the change in the nature of the teacher's classes from year to year. Indirect teaching behaviors as identified by Flanders' Interaction Analysis (Amidon and Flanders, 1967) include positive reinforcing verbal behaviors such as accepting students' feelings and ideas and praising students. Direct or negative teacher verbal behaviors include lecturing, giving directions and criticizing student behavior. Oppenlander (1969) actually investigated the relationship of change in teacher behavior to differences between classes. The results of Oppenlander's study (1969) indicated that four teachers, each teaching two different sixth grade classes, became more direct when teaching the higher achieving class and more indirect when teaching the lower achieving class.

Many studies of the interaction process have been carried out using correlational designs. These studies indicated that there may be systematic relationships between positive teacher behaviors and positive student behaviors, and between negative teacher behaviors and negative student behaviors (Bookout, 1967; Harvey, 1968; Lahaderne, 1967; Morrison, 1965).

The following studies indicated that positive, accepting, rewarding or indirect teaching behaviors and positive pupil behaviors occurred concurrently. Anderson (1943) observed that when a teacher worked with a child in an integrative or indirect way rather than dominative or direct way, the child's spontaneity and initiative tended to increase. Morrison (1965), using a modified Observation Schedule and Record (OScAR), found that teacher participation, mobility, and assistance in elementary schools were positively correlated with pupil participation, mobility, assistance and empathy. Bookout (1967) used a modified OScAR and Reed's pupil inventory to assess the class climate for ninth grade girls' physical education classes. She found that the integrative interactions factor comprised of positive teacher behaviors, was related to a supportive climate.

The relationship between positive teacher behaviors and positive student behaviors noted in the correlational studies above was supported in an experiment designed by McDonald, Allen and Orme (1966). Videotapes were made of intern teachers' teaching during a viewing of their videotapes; some of the intern teachers were reinforced by the experimenter for positively reinforcing student participation and some were not. The investigators found that the pupils of the reinforced teachers participated in class discussions more than pupils of the nonreinforced teachers. They also noted that the reinforced teachers seemed to use less negative reinforcement with their students than did the others.

Additional correlational investigations have indicated that positive teacher behavior was associated with less negative pupil behavior and that positive pupil behavior was associated with less negative teacher behavior. Simon (1966) using Interaction Analysis found that student teachers used more praise in their preferred class than they did in their less preferred class. Gordon (1966) using the OScAR, found that supportive teacher behavior was negatively correlated with pupil hostility.

Lahaderne (1967) found that student attention, a component of positive student behavior, was positively correlated with IQ and was relatively stable over a range of activities as well as in classes for which the students had diverse preferences. Thus, it was not surprising that when Turner (1967) reanalyzed the data from Flanders' 1960 study, he found that the most indirect teachers had more bright students. To supplement these findings, Cogan (1963) concluded that pupils' self-initiated work and high scores on required work were positively related to teacher inclusive i.e.,indirect, behavior.

The relationship between critical, nonaccepting, punishing or direct teaching and pupils' negative behavior was revealed in many of the correlational studies. Harvey (1967), using observers to rate teacher and student classroom behaviors, noted that the more a teacher was dictatorial and punitive the less the students were cooperative, helpful, involved, active and achieving course objectives. Lahaderne's (1967) finding that boys' negative attitudes were correlated positively with teacher prohibitory messages further supported the hypothesis that negative student behavior is related to negative or direct teaching behaviors.

Some of the observational or case studies emphasized negative student behaviors and teacher correlates. Gordon (1966) noted a positive correlation between disorderly pupil behavior and teacher hostility. Bookout (1967) noted that a defensive climate was moderately related to the teacher's restraining directions. Cunningham (1948) and Jenson (1955) also observed the relationship between aggressive or threatening classes and dictatorial or restrictive teacher behavior. Cody's (1966) study of a slum school class illustrated a negative classroom behavior cycle. He concluded that the pupils exercised control and resistance because their legitimate initiation attempts failed. Soon the class gave the teacher strong negative reinforcement by passive resistance using subtle techniques such as slowing down or over-reacting to some of the teacher's directions. As a result, the teacher became even more controlling.

Some of the correlational studies mentioned other similarities between teacher and pupil behaviors. Morrison (1965) found that teacher and student negative categories were significantly related, but that most pupil negative behaviors were physical and covert instead of verbal. Baxter (1946) observed that the reactions of pupils and their teachers were similar; i.e., when the teacher was tense, the children were tense. Overly (1967) noted that, in general, student response patterns reflected teacher response patterns.

In conclusion, these correlational studies suggested that positive or indirect teacher behaviors were associated with positive student behaviors and that negative or direct teacher behaviors were associated with negative student behaviors. However, these studies were correlational and not causal. Thus, although some of the authors of these correlational studies emphasized the importance of the teacher's behavior in eliciting positive or negative student behaviors, it appears that students may have substantial influence on their teachers' positive or negative behaviors.

While the experimental studies have been considered to determine the influence of student behavior on teacher behavior, relevant experiments have been conducted in social psychology and counseling. Such psychological experimental studies have indicated that one or more individuals can influence the behavior of a target person. Conditioning studies reviewed by Krasner (1966) revealed that positive reinforcement influenced subjects to emit more of the reinforced behavior and to have fewer undesirable side effects than did negative reinforcement. Rosenfeld (1967) observed interviews conducted by adults with eighth grade students on a one-to-one basis. He found that when the interviewer followed each student's answer with approving response such as a smile, head nod, verbal acknowledgment and gesticulation, the students showed higher percentages of smiles and head nods than they did when the interviewers gave disapproving responses or no response. Sarbin and Allen (1968) found that two professors could increase the verbal participation of previously low participating students by using verbal and nonverbal social reinforcement during and after student speech. These studies supported the idea that positive behavior elicits positive behavior and that negative behavior elicits negative behavior. However, it should be noted that the higher ranking person was the influencer.

More pertinent to the present study were counseling studies in which the lower ranking client influenced the behavior of the higher ranking counselor. Most of these studies were also relevant to the present research since the client actors delivered the prescribed experimental behaviors to an unsuspecting counselor. Bandura, Lipsher and Miller (1960) found that when hostility was focused on the therapist, he was apt to make an avoidance response. Gamsky and Farwell (1966) noted that an increase in client hostility resulted in an increase in negative behaviors in counselors. Russell and Snyder (1963) observed that hostile clients evoked more counselor anxiety than did friendly clients. Heller, Myers and Kline (1963) found that hostile client behavior evoked hostile interviewer behavior and that friendly client behavior evoked friendly interviewer behavior. In a related study, Sandler (1969) found that affective or feeling statements by the client were more likely to be followed by affective counselor remarks than by non-affective statements.

Also pertinent to the present study, are the few psychological studies which demonstrated how groups influenced individuals, since this situation closely parallels the classroom arrangement. In the studies of Hastorf (1965), and Zdep and Oakes (1967), the experimenters successfully manipulated experimental conditions to increase or decrease a group member's verbal participation and leadership attempts. In one of the experiments reported by Hemphill (1960), it was found that a group could influence its leader to make more or fewer attempts to lead. In a somewhat different context, Blubaugh (1966) found that negative audience feedback increased the speaker's total non-fluencies, decreased the speaker's rate of speaking and verbal output, and made the speaker dissatisfied with and dislike the speaking experience. Thus, evidence from the correlational classroom studies and from the counseling and experimental psychological studies strongly suggested that students do influence teacher behaviors. Further they suggest that the direction of the influence may be predictable.

Although no causal studies have focused on determining whether or not students influenced their teacher's behaviors, theorists have recognized this potential influence. Ryans' (1963 b) model of teacher information processing is composed of "internal information inputs" or teacher characteristics and "external information inputs" in which pupil behavior is the central variable. Lippitt (1964) theorized that in the sphere of school influences, teacher role decisions and behaviors would be influenced by a number of variables. These variables included their pupils, peer teachers, supervisors and professional societies. Turner (1967) using a reinforcement model, identified the students as a "locus of deprivations" or "positive reinforcers" for their teachers. In addition, Flanders (1967) and Horwitz (1960) both suggested that the age and maturity of the students may influence the teacher's behavior since students of different ages and levels of maturity behave differently.

As has been demonstrated above, a rationale for the position that students influence teachers may be found in several disciplines. The most useful appears to be Homans' exchange theory (1961) which is based on concepts borrowed from behavioral psychology and elementary economics. Homans, in his exchange theory of elementary social behavior, suggests that the amount of change or influence in a person's behavior depends upon the frequency of the interaction. Thus, if there is little or no interaction, communication or reinforcement, there will be little or no influence.

Unlike reinforcement theory on which it is partially based, Homans' theory of social exchange clearly predicts the direction of change in a person's behavior after both positive and negative reinforcement. Reinforcement theory alone predicts that positive reinforcement would tend "to maintain or increase the strength of a response or stimulus response connection." (Deese, 1967, p. 25). Homans' exchange theory augments reinforcement theory by predicting that a person receiving positive reinforcement would have positive feelings while he continues the rewarded activity. These positive feelings toward the exchange would influence the recipient to give the originator of the reinforcement more rewards to continue the interaction in order to receive more profits.

According to reinforcement theory, negative reinforcement would cause a person to change his behavior, but the direction of the behavior after punishment is more variable and harder to predict than behavior after positive reinforcement. Homans is in agreement with reinforcement theory in predicting that if a teacher receives punishment or, as Homans terms it, high costs, he will change his behavior. However, according to exchange theory the direction of change in the recipient's behavior is clearer. The person who faces high costs or punishment would feel negative emotions which may become visible as negative behaviors. Eventually this person may desire to withdraw from the exchange if his costs exceed his rewards.

The theory of social exchange discusses how the directions of behavioral change after positive or negative reinforcement are determined by the quantity and value of the activity exchanged. According to Homans, the value per unit of activity; i.e., reward or cost, received is determined by the economic principle of marginal utility. However, the original positive or negative evaluation of the type of activity is not measured by the frequency or value per unit of behavior evoked from the recipient, which would be tautological. Instead, the original value of an activity is measured by comparison; i.e., asking a person to indicate his relative costs and rewards or by studying a person's history of experiences. According to Homans, the relative cost or reward value of a behavior may also be determined by learning what previous reinforcements a person has received. Thus, as each individual's history is unique, his values differ. Despite this, Homans says that some human values are somewhat invariant, especially if the subjects have had similar cultural backgrounds or experiences.

The conditions under which predictions of direction are possible are limited by two basic assumptions. First, it is assumed that the subject is free to respond positively or negatively to any situation and that the subject's reactions may be unconscious. If a subject has freedom to respond to any situation, his behavior must not be controlled completely either by others or by his internal reflexive mechanisms. Thus, an influencer would not have complete "fate control" over the recipient's behavior. This assumption was supported by Crandall, Katkovsky and Crandall (1965) when they pointed out that rewards and punishments lost reinforcement value if a person did not believe that he had some control over them. Thibaut and Kelley (1959) also observed that an individual was not free to respond in either a positive or negative direction if the person's responses were under the control of reflexive or imitative behavior. The second assumption suggests that a subject may react to another's behavior without being consciously aware of what the person is doing. In support of this assumption, Emmer (1967) found that accuracy of perception of student initiation was unrelated to the teachers' ability to increase their use of student ideas or initiation.

Since the assumptions of the exchange theory are generally met in the teaching role, Homans theory can be used to predict how students influence teacher behavior. According to exchange theory, if there is an interaction between students and teachers, there will be influence or change. If the students give the teacher more positive or negative reinforcement than the teacher has given them, it is likely that the teacher's behavior will change to a greater extent than it would have changed if the rewards and costs had been equally exchanged.

Exchange theory can be utilized to predict how students' positive or negative behaviors influence teacher positive or negative teaching behaviors. Specifically, Homans' exchange theory would predict that after receiving rewards from a student, both indirect and direct teachers will become more positive or indirect. This positive relationship exists because as the teachers acquire positive feelings toward their students, they will give the students more rewards such as praise, acceptance and clarification of student ideas. These positive teacher behaviors will encourage the students to continue their interaction with the teacher. Exchange theory also predicts that after negative reinforcement both indirect and direct teachers will become more negative or direct. In behaving more negatively or directly, a teacher would be likely to criticize his students and even withdraw from interaction with the class by limiting the students' chance to talk in the classroom, by frequent absences or by changing occupations.

It may be anticipated that teachers will have similar values which they use in assessing their rewards or costs in interactions with their students. According to exchange theory some human values are somewhat invariant, especially if the group of subjects studied have similar backgrounds and experiences. Thus, to the extent that teachers share some common history and have similar role expectations and norms, they may be expected to evaluate certain extreme positive and negative student classroom behaviors comparably.

Based on the review of the literature and Homan's exchange theory, it may be predicted that students do influence teacher behaviors. Further, the exchange theory permits a prediction of the direction of change. To determine whether or not these predictions can be substantiated, this experimental study was designed to test the following hypotheses:

1. There will be a significant change in teacher behavior when there are changes in student behaviors.
2. Teacher behavior will be significantly more positive or indirect during periods of positive student behavior than during periods of negative student behavior.
3. Teacher behavior will be significantly more positive or indirect during periods of positive student behavior than during periods of natural student behavior.
4. Teacher behavior will be significantly more positive or indirect during periods

of natural student behavior than during periods of negative student behavior.

CHAPTER II

PROCEDURE

A primary purpose of this experimental study was to ascertain whether or not teacher behaviors were influenced by students' classroom behaviors. As discussed in Chapter I, evidence from experiments in nonclassroom situations indicated that when two or more people interacted, one or all were influenced by the interaction. In addition, the evidence and theories suggested that if interaction occurred, a change could result. In classroom research, studies of relationships between student and teacher behaviors have been largely correlational in nature. The results of these studies demonstrated that certain student behaviors and certain teacher behaviors tended to occur together. However, the nature of the research did not enable investigators to determine the role of the student behaviors in the determination of teacher behaviors. Thus, the present study was designed to investigate whether or not student behavior influenced teacher behavior and, if so, in what direction.

Subjects

Twenty-four college teachers were subjects in this experiment. These subjects ranged from graduate teaching assistants to full professors in six different universities. However, they were not the assigned teachers of the classes in which the experiment took place. Additional data is contained in Appendix A.

Experimenters

The experimenters were the undergraduate and graduate students in 24 education classes in six different universities. The subject matter of the classes ranged from elementary education to the social foundations of education and educational statistics. For additional data regarding the experimenters see Appendix A.

Method

The procedure used in the study was a direct reversal of that used in most educational experiments in which students served as subjects and teachers, or other adult investigators, as experimenters. In this investigation, teachers served as subjects in 24 experiments while students in the classes assumed the role of experimenters. Each experiment was designed to last one hour and was divided into four 15 minute periods. The student experimenters carried out designated positive, negative or natural behaviors during each of the four periods of the experiment. The order of the treatments was counterbalanced during each of the 24 individual experiments as indicated in Figure 1, p. 24. Two teachers were randomly assigned to each of the 12 basic treatment orders.

As was indicated earlier, the teachers who participated as subjects were not the teachers assigned to the classes. Rather they were guest instructors invited to teach the class for the hour of the experiment. This was done to avoid complications arising from differences in teachers' knowledge of their classes due to time in semester, type of course, etc., and to facilitate giving the experiment instructions to the students.

Since it was likely that knowledge of the experiment could influence the subject teachers' classroom behaviors, the subjects were not informed that an experiment was being conducted until a postexperiment interview. This secrecy was possible since the subjects were not the assigned teachers. Instead, a cooperating faculty member was contacted, informed of the experimental requirements and asked to arrange to have a fellow faculty member teach a class about a topic in the guest teacher's area of competency. The visiting or subject teachers were given no information about the experiment, but the cooperating faculty member was asked to mention that his class preferred some discussion time or a chance to participate. There-

Figure 1

Treatment Orders Based on a Repeated Measures Intermixed Latin Squares Design

Order	Subject Teachers	15-Minute Time Periods 1st Per.	2nd Per.	3rd Per.	4th Per.
1	S-1 S-2	positive	negative	control a	control b
2	S-3 S-4	negative	control b	positive	control a
3	S-5 S-6	control a	positive	control b	negative
4	S-7 S-8	control b	control a	negative	positive
5	S-9 S-10	positive	control a	control b	negative
6	S-11 S-12	negative	control b	control a	positive
7	S-13 S-14	control a	negative	positive	control b
8	S-15 S-16	control b	positive	negative	control a
9	S-17 S-18	negative	positive	control a	control b
10	S-19 S-20	control b	control a	positive	negative
11	S-21 S-22	positive	control b	negative	control a
12	S-23 S-24	control a	negative	control b	positive

fore, all the subject teachers were encouraged to promote interaction.

Preceding each experiment, the investigator informed the student experimenters of their roles without telling them the experimental hypothesis. Using tape recorded and written instructions (Appendix B), the students were told that they were to be the experimentors in an investigation which would last one hour during their subsequent class when a guest teacher was to appear. The instructions explained the experiment and the signals for changing behaviors during the four consecutive 15 minute treatment periods. During the two control 15 minute periods, the students were directed to behave as they usually would. During the other two periods the students were directed to behave according to the positive and negative verbal and nonverbal experimental specifications which were outlined in the instructions.

The experimenters were asked to perform their experimental roles in as natural a manner as possible during the positive and negative treatment periods. In addition, to increase the uniformity among the 24 experiments, nine students were asked to volunteer to carry out specified behaviors during the experimental periods. Of these, three performed a designated positive behavior, three a designated negative behavior, and three designated positive and negative behaviors (Appendix C). In all cases, the nine students carried out the assigned behaviors during the appropriate time periods, one time only. This was done to avoid arousing suspicions of the subject teacher. The student behaviors selected were categorized as either positive or negative according to their use in social psychological and classroom research studies (Blubaugh, 1966; Cornell, 1953; Gotts, 1967; Jenkins & Deno, 1969; Lahaderne, 1967; Morrison, 1965; Parakh, 1967; Sarbin, 1964, 1968).

During each experiment the teacher's verbal behaviors were recorded by a concealed tape recorder. These tapes were later analyzed using Flander's Interaction Analysis (Amidon & Flanders, 1967) (Appendix D), by a neutral coder well trained in the use of this instrument. While the verbal behaviors were tape-recorded, the teacher's nonverbal actions were recorded by a student using a Visual Observational Schedule of Teacher Behaviors (Appendix E). Prior to each experiment the student volunteer was instructed in the use of the Visual Observational Schedule of Teacher Behaviors and asked to become familiar with the instrument.

At the conclusion of each experiment the subject teacher was asked to fill out a questionnaire on his preference for student behavior (Appendix F) and was interviewed about his thoughts during the experiment. Finally, the subject teacher was briefed on the nature of the experiment and his permission to use the data was requested and granted.

Instruments

As previously mentioned, both verbal and nonverbal aspects of teacher classroom behaviors were measured in the present study. The Flanders' Interaction Analysis instrument was used to code the teacher verbal classroom behaviors, and the Visual Observational Schedule of Teacher Behaviors to code the teacher nonverbal behaviors.

The Flanders' Interaction Analysis Observational schedule (IA) (Appendix D) was chosen since it has been used widely in classroom research (Amidon and Simon, 1965; Rosenshine, in press; Soar, 1966); and has established levels of inter-rater agreement. In this experiment the average inter-rater agreement between the original coder and a coder equally qualified in the use of IA was .92 (Appendix G). It should also be noted that the original coder established an intra-rater agreement of .93 (Appendix G) on an initial coding of three tapes and a consistency check three weeks later. Another major advantage of IA is that the matrices formed from the sequential codings of teacher and student verbal behaviors may be interpreted to identify numerous patterns of teaching behavior.

Two patterns of verbal teaching behavior or verbal dependent variables were chosen to measure total and immediate reinforcement aspects of the teacher's positive and negative verbal behaviors. It should be noted that positive teacher behaviors such as accepting student feelings, praising students and clarifying student ideas are called indirect behaviors in the discussion of these Flanders' IA variables. Negative teacher behaviors such as giving directions and criticism are direct behaviors in the discussion of IA variables. The two IA variables chosen to measure the total and immediate reinforcement aspects of teacher indirect and direct behaviors were not independent measures of teacher behaviors since the variable which measured the teacher's immediate responses to student talk was a portion of the total teacher response variable.

The specific behavior pattern measured by IA Variable I, the common indirect to direct teaching ratio or i/d as shown in Appendix D (Flanders, 1960; Soar, 1966), was the ratio of teacher indirect behaviors, such as praising students and accepting their feelings and ideas, to teacher indirect and direct behaviors, such as criticizing and giving directions to the students. To calculate this i/d ratio $\left(\frac{(1-3)}{(1-3)+(6-7)}\right)$ the number of tallies in columns 1, 2, and 3 were divided by the number of tallies in columns 1, 2 and 3 plus those in 6 and 7 which are the shaded areas in the matrix for IA Variable I, Appendix D. However, since this variable was used to assess teacher emphasis on motivation and control, it did not include the neutral questioning and lecturing teacher behaviors which are shown in columns 4 and 5 in the matrix for IA Variable I.

IA Variable I was chosen because it measured all of the teacher total positive and negative behaviors for each of the 15 minute treatment periods. Homans' exchange theory is based on the concept that a person's behavior is influenced by the entire exchange situation rather than solely by the partner's immediately preceding act. Thus, all of the positive and negative teacher behaviors in the exchange situation were measured to learn if exchange theory predictions held true for classroom situations over 15 minute periods.

IA Variable II, which measured the teacher's immediate responses to student verbal behavior was analyzed to learn if Homans' theory was supported for immediate as well as continued exchanges. IA Variable II was similar to IA Variable I except that IA Variable II measured only a portion of positive teacher behavior which immediately followed student verbal behavior. Measurement of this IA Variable II was possible due to the sequential nature of the IA coding system matrix. It has been used in classroom research by Soar (1966) and by Powell and Birkin as reviewed by Rosenshine (in press). To calculate this IA Variable II or i/d ratio 8-9, the number of tallies in columns 1, 2 and 3 for rows 8+9 were divided by the number of tallies in columns 1, 2 and 3 plus those in 6+7 for rows 8+9. These areas are shaded in the matrix for IA Variable II, Appendix D.

Since nonverbal teacher behavior was a consideration of this study, it was necessary to develop a special instrument. Therefore, the Visual Observational Schedule of Teacher Behaviors (VOS) (Appendix E) was designed expressly for this investigation to record teacher positive and negative nonverbal behaviors. To help in establishing these positive and negative classifications, the positive teacher behaviors were subdivided into three major categories: agreement, friendly contact, and attention to students. The negative teacher behavior categories were disagreement, critical contact with the student, passive withdrawal from the student and lack of attention to the student. Similar nonverbal teacher behaviors such as reinforcement, facilitation and attention have been noted by Galloway, (1968). The specific VOS variable analyzed later was the percentage of positive nonverbal teacher behavior tallies to the total nonverbal teacher behavior tallies.

Since the VOS was an experimental instrument, a reliability measure was needed. Ten raters were used to observe the same teacher and this yielded a reliability coefficient of .90 (Appendix H).

Design and Statistical Analysis

The purpose of this experiment was to learn whether or not differences between student experimental treatments influenced teacher behaviors. To isolate this relationship, it was necessary to control as many potential sources of error as possible. One major source could be variability between the teachers. To reduce this effect, each of the 24 teachers were used as his own control.

The second source of error could be order effects of treatments. If the treatments had been given in a fixed order, systematic biases may have been present and obscured or confounded effects which were due to the differences between the treatments. In addition, if the same fixed order of treatments had been used for each teacher, the researcher would not know whether the results were due to differences between the treatments or between the time periods. Even repeated use of several fixed orders of treatments may have been unwise because there may have been confounding order effects caused by systematic carry-over effects occurring when a treatment period is influenced by antecedant treatment periods. To counteract this, it was necessary to randomize and balance all treatment orders with respect to the main effects. A 4X4 Latin square would provide four different orders of treatments or sequences. However, if the same four randomly selected orders had been used repeatedly, order carry-over effects could have been amplified. Thus, a design (Figure 1, p. 24) similar to an Intermixed Latin Squares Design (Cox, 1958, pp. 42-43) was used to counterbalance the order of the treatments used during the 24 individual experiments.

Therefore, in the present experiment an Intermixed Latin Squares Design with all 12 permutations of positive, negative and control treatments was used to attempt to balance out any carry-over effects which might have appeared for the different orders of treatments. Since 24 teachers were used it was possible to randomly assign two teachers to each of the 12 sequences or orders of treatments (Figure 1, p. 24). A modification of Winer's Repeated Measures Analysis of Latin Squares (1962, pp. 549-554) was used to analyze separately each of the verbal and nonverbal variables to test hypothesis 1 to determine if there was a significant change in teacher behavior as a function of student behavior. The structural model and formulas for this Repeated Measures Analysis of Intermixed Latin Squares are presented in Appendixes I and J.

After this analysis of variance, treatment means for each of the verbal and nonverbal variables were compared to test the directional hypotheses. Thus, to test hypothesis 2 the positive and negative treatment period means for each verbal and nonverbal variable were compared separately to determine if teacher behavior was more positive when students behaved positively than when students behaved negatively. Similarly, to test hypothesis 3, the positive and natural or average control period means were compared separately for each verbal and nonverbal variable to determine if teacher behavior was more positive when students behaved positively than when they behaved naturally. Finally, to test hypothesis 4, the average natural or control period means were compared separately for each verbal and nonverbal variable to determine if teacher behavior was more positive when students behaved naturally than when they behaved negatively. Significant differences between means were established by using the Tukey(a) procedure described in Appendix K.

CHAPTER III

RESULTS

Twenty-four teachers were subjects in one hour experiments designed to determine whether or not changes in teacher behavior occurred as a function of changes in student behavior during four 15 minute periods. Four hypotheses were tested to determine the nature of the change in the verbal and the nonverbal variables which measured teacher behavior. The Interaction Analyses (IA) Variables were chosen to measure the total and immediate reinforcement aspects of the teachers' positive and negative verbal behavior. A Visual Observational Schedule Variable was chosen to measure the percentage of positive to total teacher nonverbal behavior. The composite Interaction Analysis Matrices and Visual Observational Schedule Frequencies for each treatment period are reported in Appendix L.

Changes in Teacher Verbal Behavior

The first task of the experiment was to test hypothesis one which predicted that teacher behavior would change when student behavior changed. To determine whether or not teacher verbal behavior changed when student behavior changed, the entire experiment was analyzed twice, once with IA Variable I, and again with IA Variable II as dependent variables, using the Repeated Measures Analysis of Variance for an Intermixed Latin Squares Design discussed in Chapter 2, pp. 31-33. Thus, hypothesis one was tested, based on analysis of IA Variable I, to determine the effect of student behavior change on the ratio of the teachers' total indirect to indirect and direct verbal behavior. Similarly, IA Variable II was analyzed to determine the effect of student behavior change on the ratio of teachers' indirect to indirect and direct responses immediately following student talk. As indicated in Table 1, there were significant treatment effects for both IA Variables.* Therefore, it was concluded that there were significant differences among the teachers' verbal behavior during the positive, negative and control periods. This indicated that changes in teachers' behavior were a function of changes in students' behavior.

Upon learning that teacher verbal behavior was significantly different during the different treatment periods, it was possible to compare the treatment means using each of

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* Homogeneity of Variance tests showed no violation of the assumptions for between and within subject variance. (See appendix M).

Table 1

The Analysis of Variance of the Teacher Verbal IA Variables I and II

		IA Variable I $\frac{(1-3)}{(1-3) + (6-7)}$		IA Variable II $\frac{(1-3) \text{ for rows } 8+9}{(1-3) + (6-7) \text{ for rows } 8+9}$	
Effects	df	Mean Square	F	Mean Square	F
Between Subj.	23	.060		.027	
Orders	11	.063	1.098	.034	1.662
Subj. within Orders	12	.057		.020	
Within Subj.	72	.071		.050	
Periods	3	.032	.840	.015	.570
Treatments	3	.732	19.315*	.542	20.372*
ABO'	30	.049	1.298	.032	1.194
Error	36	.038		.027	

*Sig. at P. 001

the two IA Variables to test the three hypotheses which predicted the direction of teacher behavior change. The verbal section of hypothesis two predicted that teacher behavior as measured by IA Variable I and IA Variable II would be significantly more indirect during periods of positive student behavior than during periods of negative student behavior. As shown in Table 2, the percentage of teachers' total indirect to indirect and direct verbal behavior, IA Variable I, and the percentage of teachers' indirect to indirect and direct responses immediately following student talk, IA Variable II, were greater during periods of positive student behavior than during periods of negative student behavior. Therefore, it can be concluded that the teachers in the sample behaved more indirectly when the students behaved positively, than when the students behaved negatively. However, it should be noted that means for the negative periods were sufficiently high to qualify as indirect had they been found in Flanders' sample of junior high school subjects (1960).

Hypothesis three, as measured by IA Variable I and IA Variable II, predicted that teacher behavior would be significantly more indirect during periods of positive student behavior than during control periods of natural student behavior. To test this prediction, the positive and control period means for each IA Variable were compared separately to determine

Table 2

Comparison Between Treatment Means of the Teacher Verbal IA Variables I and II

Variables	Positive		Negative		Control a		Control b		Av. Control
	Mean	sd	Mean	sd	Mean	sd	Mean	sd	Mean
IA Var. I	.863	.139	.516	.286	.797	.213	.903	.173	.850
IA Var. II	.921	.132	.634	.263	.922	.106	.956	.096	.939

	IA Variable I $\frac{(1-3)}{(1-3)+(6-7)}$			IA Variable II $\frac{(1-3) \text{ for rows } 8+9}{(1-3)+(6-7) \text{ for rows } 8+9}$		
Treatments	Hypothesis	Diff. Between Means	q	Hypothesis	Diff. Between Means	q
$\bar{\bar{X}}_+ - \bar{\bar{X}}_-$	2 a	.347	8.731*	2 b	.287	8.623*
$\bar{\bar{X}}_+ - \bar{\bar{X}}_c$	3 a	.013	.327	3 b	.018	.541
$\bar{\bar{X}}_c - \bar{\bar{X}}_-$	4 a	.334	8.403*	4 b	.305	9.164*
$\bar{\bar{X}}_{c_a} - \bar{\bar{X}}_{c_b}$	check on controls	.106	2.667	check on controls	.033	.991

* Sig. at P.01 df = 36 n = 24 Tukey (a)

whether or not teacher behavior was more indirect when students behaved positively than when students behaved naturally. The results found in Table 2 indicated that there were no significant differences between teacher verbal behaviors as measured by either IA Variable during the positive and control periods. This lack of support for hypothesis three indicated that the verbal behavior of the teachers in the sample varied little between the positive treatment periods and the control periods.

Hypothesis four predicted that teacher behavior as measured by IA Variable I and IA Variable II would be significantly more indirect during control periods of natural student behavior than during periods of negative student behavior. As indicated in Table 2, the comparisons between the control and negative treatment period means as measured by IA Variable I and II supported hypothesis four. This indicated that the teachers in the sample behaved more indirectly during control periods than during periods of negative student behavior.

In summary, the results of the analyses of immediate and total teacher verbal behaviors were consistent. They both supported hypotheses one, two and four and failed to support hypothesis three.

Changes in Teacher Nonverbal Behavior

The nonverbal measure of teacher behavior was based on the Visual Observational Schedule of Teacher Behavior, (VOS). The VOS Variable was analyzed in the same manner as the interaction analysis variables to test the same four basic hypotheses. Thus, the nonverbal section of hypothesis 1 was tested by analyzing the VOS Variable to determine the effect of student behavior change on the teachers' nonverbal behavior. The results of this analysis of variance are shown in Table 3.* Since hypothesis one as measured by the VOS Variable was supported, it may be concluded that the teachers in the sample changed their nonverbal behavior as a function of change in student behavior.

Upon determining that teacher nonverbal behavior was significantly different during the different treatment periods, it was possible to compare the treatment means of the VOS Variable to test the three hypotheses which predicted the direction of change in the teachers' nonverbal behavior. Hypothesis two predicted that teacher nonverbal behavior would be significantly more positive during periods of positive student behavior than during periods of negative student

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* Homogeneity of Variance tests showed no violation of the assumptions for between and within subject variance.

Table 3

The Analysis of Variance of the Teacher Visual Observational Schedule or VOS Nonverbal Variable

Effects	df	Mean Square	F
Between Subj.	23	68944.48	
Order	11	49541.48	.571
Subj. within Order	12	86730.57	
Within Subj.	72	35080.54	
Periods	3	9800.59	.831
Treatments	3	585014.53	49.631*
ABO'	30	10567.07	.896
Error	36	11787.27	

*Sig. at P .001

behavior. As indicated in Table 4, the results of the comparison between the means of the VOS treatment periods supported this second hypothesis. Thus, the nonverbal behavior of the teachers in the sample was more positive during periods of positive student behavior than during periods of negative student behavior.

Hypothesis three predicted that teacher nonverbal behavior would be more positive when the students acted positively than when the students acted naturally. The results in Table 4 indicated that hypothesis three was not supported. Thus, it can be concluded that the teachers behaved in much the same way during both positive treatment and control periods.

The fourth and final nonverbal hypothesis predicted that teacher behavior as measured by the VOS Variable would be more positive during control periods of natural student behavior than during periods of negative student behavior. The results shown in Table 4 supported this hypothesis and indicated that the nonverbal actions of the teachers in the sample were more positive during the control periods of natural student behavior than during periods of negative student behavior.

Table 4

Comparison Between Treatment Means of Nonverbal Teacher VOS Variable

	Positive	Negative	Control a	Control b	Av. Control
Mean	914.833	599.870	900.791	919.541	910.166
sd	.148	.219	.122	.115	

Treatments	Hypothesis	Difference Between Means	q
$\bar{X}_+ - \bar{X}_-$	2 c	314.963	15.010*
$\bar{X}_+ - \bar{X}_c$	3 c	4.667	.222
$\bar{X}_c - \bar{X}_-$	4 c	310.296	14.788*
$\bar{X}_{c_a} - \bar{X}_{c_b}$	check on controls	18.75	.894

* Sig. at P.01 df = 36 n = 24 Tukey (a)

Summary

In summary, it should be noted that results of the analyses of teacher behavior as measured by the two verbal interaction analysis variables and the nonverbal VOS Variable were consistent. They all supported hypotheses one, two and four and failed to support hypothesis three.

CHAPTER IV

DISCUSSION

Despite recognition of the importance of studying classroom interactions, little attention has been focused upon the students' contributions to the total classroom climate in general or to teachers' behavior in particular. The present study was designed to investigate whether or not student classroom behaviors do influence teachers' classroom behaviors, and if so, to determine whether the direction of change is predictable as has been suggested by previous research and Homans' exchange theory.

To determine whether or not the predictions could be substantiated, the present experiment was designed to test the following hypotheses:

1. There will be a significant change in teacher behavior when there are changes in student behaviors.
2. Teacher behavior will be significantly more positive or indirect during periods of positive student behavior than during periods of negative student behavior.
3. Teacher behavior will be significantly more positive or indirect during periods of positive student behavior than during control periods of natural student behavior.
4. Teacher behavior will be significantly more positive or indirect during control periods of natural student behavior than during periods of negative student behavior.

The first hypothesis which predicted that there would be significant changes in the verbal and nonverbal behaviors of the teachers when there were changes in student behavior was supported. This finding was in accord with the results of other classroom investigations which suggested that teachers might have been influenced by students (Feshbach, 1969; Jackson, et. al., 1969; Jenkins & Deno, 1969; Oppenlander, 1969; Soar, 1966; Tuckman and Oliver, 1968). It was also in accord with the classroom behavior models of Ryans (1963) and Lippit (1964) as well as Homans' (1961) exchange theory and the reinforcement theory on which it is partially based.

Upon determining that the teachers in the sample did in fact, change their teaching behavior when students changed their experimental behavior, it was possible to test the remaining hypotheses which predicted the direction of change. To test hypothesis two, the means of the teachers' verbal and nonverbal behavior during both the positive and negative periods were compared. These comparisons revealed that the teachers' verbal and nonverbal behaviors were more positive when the students behaved positively than when the students behaved negatively, thereby supporting hypothesis two.

The results of hypothesis four were similar to those of hypothesis two. When the means of teachers' verbal and nonverbal behaviors during the natural periods were compared with the means during the negative periods, it was found that the teachers behaved more positively when the students behaved naturally than when the students behaved negatively as was predicted. It should be noted, however, that the third hypothesis which predicted that teachers' verbal and nonverbal behavior would be more positive when the students behaved positively than when the students behaved naturally was not supported. This finding suggests that natural student behavior was largely positive.

Support for this suggestion was gleaned from an analysis of the data collected on the Pupils Exercise Reinforcement schedule (Appendix N), an instrument designed for this study to ascertain the degree to which the students were carrying out instructions. The analysis indicated that student behavior during the control periods was more similar to student behavior in the positive treatment periods than in the negative treatment periods (Appendix O).

Thus, it may be concluded that when the students behaved positively, during the positive and natural experimental periods, the teachers' behavior was more indirect or positive than when the students behaved negatively. Conversely, when the students behaved negatively, the teachers became more direct or negative than when the students behaved positively. These directional findings were in agreement with Homans' exchange theory predictions and previously discussed empirical research evidence (Blubaugh, 1960; Gamsky and Farwell, 1966; Heller, et. al., 1963; Hemphill, 1960; Jenkins & Deno, 1969; Sarbin & Allen, 1968).

In light of the above results, one of the questions which should be raised is whether all teacher behaviors, or only selected ones, vary as a function of the variation in student behaviors. Within the framework of the present study it was possible to explore this question in a supplementary analysis of verbal behavior only. To do that, each category of teacher behavior from the IA schedule was analyzed for variance during the positive, negative and control periods. The two controls were combined since teacher behaviors had been demonstrated to be consistent for both. In this analysis focusing on treatment period effects, data were pooled across orders and time periods since each of these factors had been found previously to have no effect upon teacher behavior. When a single factor repeated measures analysis of variance was carried out for each of the seven verbal interaction analysis categories (Appendix B), only three of the seven IA categories were found to vary as the student behaviors varied.

Significant treatment effects were found for one positive and two negative variables; namely, teacher use of clarification, direction and criticism.

Upon ascertaining which teacher behaviors changed when the student experimental behaviors changed, it was possible to test the directional hypotheses to determine whether or not the teachers used more clarification, direction and criticism when the students behaved positively or naturally than when the students behaved negatively or naturally. The results of the comparisons of these individual teacher behavior categories were consistent with the results of the original analyses of the verbal and nonverbal variables with one exception, namely, lack of support for hypothesis four as measured by the teachers' use of clarification. This exception indicated that the teachers' use of clarification did not differ significantly during the negative and natural student behavior periods.

This detailed analysis of verbal teacher behaviors suggested that the teachers may have been more flexible in their responses to negative student behavior than to positive student behavior. Of the seven teacher behaviors, negative student behavior succeeded in inducing both of the two negative teacher behaviors, while positive student behaviors succeeded in inducing only one of the three positive teacher behaviors. Similarly, the teachers may have been more sensitive to negative student behavior than to positive student behavior as indicated by the consistent lack of support for hypothesis three. Hypotheses two and four compared teacher responses during negative versus non-negative student behavior periods while hypothesis three compared teacher responses during positive versus natural student behavior periods.

One can only speculate as to why the other positive or neutral interaction analyses teacher behavior categories failed to fluctuate as the students' behaviors changed. It was possible that the teachers' differential use of category 1, accepting student feelings, was not significant due to the infrequent use of category 1 by teachers in this experimental sample. On the other hand, possible explanations for lack of significant change in category 2, teacher praise, may have been due to the teachers' frequent, almost habitual use of mild praise. This may have been due to the possible usefullness of praise as a device for controlling student behavior. It was also interesting to note that the teachers' use of questioning, category 4, and lecturing, category 5, did not fluctuate significantly as the student behavior changed. This suggests that teacher questioning and lecturing are neutral behaviors which are less likely to be influenced by student positive and negative actions.

While a comparable formal analysis of specific nonverbal teacher behavior was not possible within the confines of this study, some informal observations appeared to support the verbal analyses with regard to the negative interactions. During the experiment, two of the teachers frequently turned their backs to the class and faced the chalk board upon receiving negative reinforcement. In addition, during the post-experimental interview with the teachers, a few of the teachers mentioned thatthey had considered leaving the class during the negative treatment period. These observations also would be consistent with the exchange theory prediction that people are apt to withdraw from an exchange when their costs exceed their rewards.

Homans' exchange theory, which is based on reinforcement theory was used as the theoretical justification for the hypothesized predictions. The results of this experiment indicated that reinforcement theory alone, may have been an adequate predictor of teacher behavior. However, exchange theory as an extension of reinforcement theory increased the precision of the prediction of teacher behavior change after negative reinforcement. Reinforcement theory, alone, predicts that when a person receives negative reinforcement, his behavior will change. Exchange theory augments reinforcement theory by predicting that after receiving negative treatment, a person would become negative and direct by withdrawing from the interaction or by criticizing the students. This change toward negative behavior after receiving negative reinforcement appeared to be supported by the results of the analyses of the second and fourth hypotheses as well as the previously discussed supplementary verbal and nonverbal evidence.

On the other hand, reinforcement theory which predicts no change in the direction of behavior after positive reinforcement may have been a more accurate predictor of teacher behavior after positive student reinforcement than exchange theory. This argument would be based on the assumption that the behavior of the teachers in the sample was normally positive as indicated by their behavior during the control periods. The lack of support for the third hypothesis indicated that when the students gave the teachers positive reinforcement during the positive treatment periods, the teachers' behavior did not differ significantly from their behavior during the control periods of natural student behavior; i.e., the teachers remained fairly positive.

The present experimental design combined both the advantages and disadvantages of being executed in a natural classroom setting. The first advantage was that the results might generalize to the classroom situation more readily than results obtained in an artificial situation. Another advantage was inherent in the use of the guest teachers who were not aware that they were participating in an experiment. This use of guest teachers as subjects facilitated the briefings of the classes of experimenters and controlled for other potentially important variables such as previous knowledge on the part of the teachers of the typical class behavior. The procedure of using guest teachers provided a control for the amount of previous interaction. A further advantage of the design was the control over the internal validity. This was effected by assigning the subjects to sequences randomly, by using each subject teacher as his own control, and by using all of the treatments with each subject.

Despite the internal validity of this experiment, there were many limitations to its external validity. The most serious limitation was due to the nonrandom selection of the subject teachers. Randomization was not used due to the previously described procedure to keep the subject teachers unaware of the experiment. Therefore, the results of the present experiment cannot be generalized to other teachers of college students.

The precaution of using guest teachers to control for internal validity may have presented other disadvantages. It would follow that the subjects may have acted differently had they been teaching their regularly assigned class. In other words, the guest teachers may have dampened their responses to student behaviors since they knew that their period of responsibility to the class was short. In fact, in the postexperimental interviews, a few of the teachers mentioned that had it been their own class they would have been more critical during the negative period. Other teachers said that they would have dismissed the class had it been their own. In addition, it is even possible that the use of guest teachers may have influenced the students' control period behaviors. In the present investigation, the college students' control period behaviors appeared to be quite positive. However, it was not known if these positive control period behaviors were indeed typical or if the students' behaviors were influenced by having a substitute teacher or by the excitement of the experiment.

Other limitations of the study rest in several of the instruments used. The Visual Observational Schedule of Teacher Behavior, (VOS) was developed to record teacher nonverbal behavior. Although, the inter-rater reliability coefficient was .90, the categories of individual nonverbal teacher behaviors were not tested. The Pupils Exercise Reinforcement schedule (PER) was also developed for this experiment to check students' positive and negative behaviors during each of the four periods of the experiment. The PER was not tested for reliability, since it was used only to ascertain whether or not experimental conditions were being carried out, rather than as a major source of data. However, many of the student behavior categories in the verbal section of the PER, such as acceptance of feelings, agreement and clarification were similar to the teacher behavior categories which were used in interaction analysis. In addition, the nonverbal section of the PER was based on mention of similar categories in the classroom studies of Beaird (1966), Galloway (1968), Kowatrakul (1959), and Lahaderne (1967).

The forced choice questionnaire on Teacher Preference for Student Behavior was also pilot in nature and used to obtain a general indication of the teachers' values regarding student behavior. Like the PER, this questionnaire was not checked for reliability. At the same time, its use was limited to checking whether the teacher preferences for student behavior were in accord with those rated as positive and negative for treatment purposes. The affirmative results are shown in Appensix Q.

It should also be noted that since these experiments were conducted in 24 different classes, no attempts were made to control possible systematic variables such as use of the same experimenters, course content and physical facilities.

Of these variables, the first would appear important to the present experiment since it was the experimenters who administered the treatments. In the investigation of this possible source of variance, the result of the PER indicated that while the experimenters in each class were different, they fulfilled their experimental roles adequately.

Due to the limitations stated above, additional research concerned with student influence on teacher behavior is needed. First, it may be of value to repeat the experiment with randomly selected guest teachers to ascertain if this could be generalized to other college education teachers. However, it may be more worthwhile to explore student influence on teacher behavior in the teacher's own class. This repetition is apt to be successful since, as indicated previously, some of the subjects in the present study suggested that teaching in the class of another, subdued, rather than changed the direction of their reactions to the students' behaviors.

It would also be interesting to ascertain how the length of the student treatment periods influences teacher behavior. Since the students were able to influence teachers' behaviors during a 15 minute period, additional research may indicate that students can influence teachers over a year even more strongly and permanently.

It may also be helpful for future experiments to control for course content. Although the teachers in the sample appeared to be consistent in their reactions to the student experimental treatments, their specific reasons for reacting positively or negatively to student behavor may have differed according to the subject area taught. During the postexperimental interviews,three of the five teachers who taught math-oriented courses mentioned that the students lack of understanding, rather than negative behavior annoyed them. Thus, a more detailed study may reveal other interactions which have different levels of importance or meanings to teachers of specific disciplines.

It is possible that a descriptive study may reveal that student behavior in certain subject areas and in some levels of education is more positive than in others. Thus, it may be especially valuable to ascertain the generalizability of the results by repeating this experiment in other than college level classes.

In addition to the above, future research in the development of new instruments and refinement of others such as the experimental VOS and PER instruments would be helpful in measuring variables related to student influence on teacher behavior. Increased use of videotaping would be valuable in assessing nonverbal behaviors accurately.

Additional research also may be initiated to determine how teachers should best react to certain types of student behavior, or the reverse. This, in time, would necessitate further research focusing on which student behaviors influence specified teacher behaviors. Thus, it may be worthwhile to investigate the relationship between student behaviors and individual nonverbal teacher behaviors, other student and teacher affective behaviors, and student and teacher cognitive behaviors. It would also be interesting to examine teacher flexibility in relation to specified student behaviors.

Finally, it may be worthwhile to examine the relationship between teacher and student characteristics, such as teacher personality and student social class in future investigations of student influence on teacher behavior. Research dealing with student influence on teacher behavior, like its counterpart dealing with teacher influence on student behavior, may examine relationships between student and teacher presage, process and product variables. In fact, student influence on teacher behavior may be an important variable to consider in future studies of teacher effectiveness. Perhaps, like student achievement and attitudes, student behavior may be an important measure of teacher effectiveness. Thus, when and if any two groups of teachers are compared, it may be wise to control for the students' behavior. If this additional precaution is taken, studies of teacher effectiveness based on student achievement might become more consistent in their identification of teacher behaviors which influence student growth.

If the results indicated in this study are found to generalize, they will have important implications for educational practices. In addition to presenting a new focus for classroom research, knowledge about student influence on teacher behavior may necessitate modification in teacher education curricula. It would seem logical that education courses should help the teachers realize that the students can and will influence their behavior. This may help beginning teachers obtain a more realistic idea of their situation so that they can make the most of the interaction. The inclusion of this information in teacher education courses may be especially important to avoid negative teacher behaviors. This was suggested by Elkind's (1968) observations that inner-city children may influence their teachers to become the usual stereotype inner-city teacher who is often a direct, critical, rigid person or a beginner, who only lasts a few months. Conversely, teachers should be helped to become aware of the possibility that positive student behavior may help them to behave more positively in turn.

Teacher awareness of student behavior may be increased by having teacher education classes utilize sensitivity training, techniques of contingency management, or microteaching so that the student teachers could gain experience handling different types of student feedback in both affective and cognitive areas. Upon developing an awareness of student behaviors, teachers may profit from instruction on how to best react to student behavior. For example guidelines may be developed to tell a teacher who received negative student behavior whether it would be best to criticize the student, to tell the student how his behavior is influencing the teacher, or to use an alternative positive behavior.

In conclusion, although it is not known if positive behavior is the norm for other college, secondary or elementary classes, the results of this experiment indicated that positive student behavior influenced the teachers to use positive behaviors. Previous research on teacher effectiveness suggested that positive teacher behavior is often associated with teacher effectiveness in promoting student growth. If this logical cycle is completed, it may be argued that a class may become more productive by teaching students how their behavior influences the behavior of their teachers. Thus, the students may be encouraged to assume responsibility for their own behavior and purposely help their teachers behave more effectively.

APPENDIX A

Subjects and Experimenters

University	Subjects	Course	Student Status	No. Students
D.C. Teachers College	Assoc. Prof.	Psyc. Testing	Undergraduate	16
	Asst. Prof.	Personality Dynamics	Undergraduate	16
George Washington	Visiting Prof.	Intro. Ed. Psyc.	Undergraduate	60
Howard Univ.	Lecturer	Statistical Methods	Graduate	24
Temple Univ.	Visiting Lect.	Curric. of Sec. Schl.	Graduate	32
	Grad. Asst.	Intro. to Grp. Dynam.	Undergraduate, Grad.	35
	Asst. Prof.	Intro. to Survey Res.	Graduate	18
	Grad. Stud.	Intro. to Grp. Dynam.	Undergraduate	34
Univ. of Maryland	Instructor	Methods of Sec. Ed.	Undergraduate	40
	Instructor	Foundations of Ed.	Undergraduate	21
	Asst. Prof.	Methods of Sec. Ed.	Undergraduate	16
	Instructor	Stat. Methods in Ed.	Graduate	16
	Grad. Stud.	Intro. Ed. Research	Graduate	18
	Professor	Methods of Sec. Ed.	Undergraduate	28
	Instructor	Educational Meas.	Graduate, Undergrad.	17
	Instructor	Methods of Sec. Ed.	Undergraduate	30
	Asst. Prof.	Occupational Choice Theory	Graduate	28

APPENDIX A
(Continued)

University	Subjects	Course	Student Status	No. Students
Univ. of Maryland (cont'd)	Assoc. Prof.	Mental Hygiene in the Classroom	Graduate, Undergrad.	27
	Grad. Asst.	Educational Meas.	Graduate	6
	Instructor	Methods of Sec. Ed.	Undergraduate	35
Univ. of So. Carolina	Asst. Prof.	Intro. Ed. Psyc.	Undergraduate	30
	Professor	Lang. Arts in Elem. School	Undergraduate	16
	Instructor	Adol. Growth and Dev.	Undergraduate	21
	Instructor	Adol. Growth and Dev.	Undergraduate	25

APPENDIX B

Directions to Experimenters

Please fill in:

Course title ___________ Date _____ Time____ Age___Sex M__F__

Please circle your level in college: Freshman, Sophomore, Junior, Senior, Master's, Doctor's

Directions:

This experiment will last one hour and be divided into 4, 15 minute sections. The signal to start the first 15-minute period will be the placing of a bright red folder at a prearranged place where most of the students can see it. To start the second 15-minute period, a blue folder will replace the red folder. For the third 15-minute period, a white folder will be used and during the last 15 minutes, a black folder will be used.

Red---Per. 1	Behave as you normally would in class.
Blue--Per. 2	Do the negative behaviors listed on this page.
White-Per. 3	Behave as you normally would in class.
Black-Per. 4	Do the positive behaviors listed on this page.

Positive Behaviors	Negative Behaviors
(Agreement or encouragement) smile, nod your head	(Disagreement) frown, shake your head
(Attentiveness) look at the teacher, have an alert posture, take notes on the teacher's remarks	(Lack of Attention) look away from the teacher, instead, look out the window, at the floor, etc.; have poor posture, slump, hold your head, send notes, knit, read, etc.
(Cooperation) Talk with your classmates only during a class discussion or with your teacher, raise your hand to answer questions, answer	(Lack of Cooperation) talk softly or whisper with your classmates, do not raise your hand to answer questions, follow the

APPENDIX B
(continued)

the teacher's questions and follow directions quickly, correctly and completely.	teacher's directions slowly, incorrectly or partially.
Six students will also do their assigned positive behaviors.	Six students will also do their assigned negative behaviors.

APPENDIX C

Special Experimental Behaviors For Nine Students

1. Positive behavior
   Offer to give the teacher chalk, erase the board, pull the window shades, etc.

2. Positive behavior
   Ask the teacher a broad, content related question.

3. Positive behavior
   Ask the teacher to clarify something easy to help us see how it fits in other places.

4. Positive behavior
   Say, "Yes, I know how you feel about ______________, one of my other professors or a person I respect, etc. felt that way, too."

5. Positive behavior
   Say, "I agree with what you said, something like that happened to me, too."

   Negative behavior
   Dr. ______________ (our regular teacher) doesn't usually do this.

6. Positive behavior
   Could we also interpret what you said as ______ to help us understand it better?

   Negative behavior
   Argue with the teacher about a small point.

7. Negative behavior
   Walk out of the room.

8. Negative behavior
   Ask the teacher to repeat his question or some other phrase.

9. Negative behavior
   Ask a specialized question that it may be hard for the teacher to answer.

APPENDIX D

Summary of Categories
For Flanders' Interaction Analysis

Klein ground rules: categorize according to function (OK may mean 2, praise or 4, question: no may mean 7, disagreement or 5, part of content)

TEACHER TALK	INDIRECT INFLUENCE	1. ACCEPTS FEELING: accepts and clarifies the feeling tone of the students in a nonthreatening manner. Feelings may be positive or negative. Predicting or recalling feelings is included.
		2. PRAISES OR ENCOURAGES: praises or encourages student action or behavior. Jokes that release tension, but not at the expense of another individual; nodding head, or saying "um hm?" or "go on" are included.
		3. ACCEPTS OR USES IDEAS OF STUDENTS: clarifying, building, or developing ideas suggested by a student. As teacher brings more of his own ideas into play, shift to Category 5.
		4. ASKS QUESTIONS: asking a question about content or procedure with the intent that a student answer, indicating that a student should talk by saying yes, OK, etc.
	DIRECT INFLUENCE	5. LECTURING: giving facts or opinions about content or procedures; expressing his own ideas, asking rhetorical questions.
		6. GIVING DIRECTIONS: directions, commands, or orders with which a student is expected to comply. (Klein ground rule for college classes-Students do not have to be observed following the directions.)
		7. CRITICIZING OR JUSTIFYING AUTHORITY: statements intended to change student behavior from nonacceptable to acceptable pattern; bawling someone out;

	stating why the teacher is doing what he is doing; extreme self-reference.
STUDENT TALK	8. STUDENT TALK - RESPONSE: talk by students in response to teacher. Teacher initiates the contact or solicits student statement. (Klein ground rule - student laughter is recorded as student talk)
	9. STUDENT TALK - INITIATION: talk by students, which they initiate. If "calling on" student is only to indicate who may talk next, observer must decide whether student wanted to talk. If he did, use this category.
	10. SILENCE OR CONFUSION: pauses, short periods of silence, and periods of confusion in which communication cannot be understood by the observer.

Copied from: Amidon and Flanders, *The Role of the Teacher in the Classroom*, 1967, p. 14.

APPENDIX D (Continued)

Interaction Analysis Variable I, $\frac{(1-3)}{(1-3)+(6-7)}$

	accepts feelings 1	praises 2	accepts ideas 3	questions 4	lectures 5	gives direction 6	criticize 7	student response 8	student init. 9	silence confus. 10
1	▨ ⧄	▨ ⧄	▨ ⧄			⧄	⧄			
2	▨ ⧄	▨ ⧄	▨ ⧄			⧄	⧄			
3	▨ ⧄	▨ ⧄	▨ ⧄			⧄	⧄			
4	▨ ⧄	▨ ⧄	▨ ⧄			⧄	⧄			
5	▨ ⧄	▨ ⧄	▨ ⧄			⧄	⧄			
6	▨ ⧄	▨ ⧄	▨ ⧄			⧄	⧄			
7	▨ ⧄	▨ ⧄	▨ ⧄			⧄	⧄			
8	▨ ⧄	▨ ⧄	▨ ⧄			⧄	⧄			
9	▨ ⧄	▨ ⧄	▨ ⧄			⧄	⧄			
10	▨ ⧄	▨ ⧄	▨ ⧄			⧄	⧄			
Total										

(1-3) ▨   (1-3)+(6-7) ⧄

APPENDIX D (Continued)

Interaction Analysis Variable II, $\frac{\text{(1-3) for rows 8+9}}{\text{(1-3)+(6-7) for rows 8+9}}$

	accepts feelings 1	praises 2	accepts ideas 3	questions 4	lectures 5	gives direction 6	criticize 7	student response 8	student init. 9	silence confus. 10
1										
2										
3										
4										
5										
6										
7										
8	✱ ╲	✱ ╲	✱ ╲			╲	╲			
9	✱ ╲	✱ ╲	✱ ╲			╲	╲			
10										
Total										

(1-3) for rows 8+9 ✱

(1-3)+(6-7) for rows 8+9 ╲

APPENDIX E

Visual Observational Schedule of Teacher Behaviors

General Directions: Record the teacher's behavior every 10 seconds. If there is a change in the behavior, record the new or concurrent behavior categories before the end of the 10-second period.

Period___Date___Time___

The teacher behavior categories include:

Positive Behaviors

Agreement (smile, nod)

Friendly Contact with Students (help student, signal for student to continue, walk or lean close to student)

Pay Attention to Students (look student in the eye, have appropriate expression)

Negative Behaviors

Disagreement (frown, shake head)

Critical Contact with Students (Do something to stop the student behavior, signal, point or make punishing noise or action)

Passive Withdrawal from Student (teacher put a barrier between self and student, walks away from students unless to use instructional materials, not call on students when their hands are up and other students are not talking)

Lack of Attention to Students (ignore students, have inappropriate expression)

Also note any key mannerisms such as putting glasses on or off, touching head, folding hands, etc.

APPENDIX F

Teacher Preference For Student Behavior

Please put a check in the blank that best indicates your preference in each of the 15 pairs of choices.

I PREFER THAT MY STUDENTS:

1. ___ are attentive by having alert posture, looking at me, taking notes on what is said, asking broad content related questions and by answering my questions quickly and correctly.

or

___ agree with what I say by smiling, nodding their heads or supporting what I said with more evidence.

---

2. ___ cooperate by volunteering to answer questions, talking to their classmates only when it helps the class, following my directions quickly, and correctly, and by offering to help me or by asking me to help them.

or

___ are inattentive and ask trite, irrelevant questions, look sleepy, fidget or play with something on their desk or answer my questions slowly, incorrectly and incompletely.

---

3. ___ agree with what I say by smiling, nodding their heads or supporting what I say with more evidence.

or

___ are noncooperative or disruptive by asking trite questions to test my knowledge, talk about non-class related matters with their friends during class and don't volunteer to answer my questions.

4. ___ disagree with what I say by frowning or saying that my statement was incorrect or by distorting my original statement.

or

___ are attentive by having alert posture, looking at me, taking notes on what is said, asking broad content related questions and by answering my questions quickly and correctly.

5. ___ are inattentive and ask trite, irrelevant questions, look sleepy, fidget or play with something on their desk or answer my questions slowly, incorrectly and incompletely.

or

___ are noncooperative or disruptive by asking trite questions to test my knowledge, talking about non-class related matters with their friends during class and don't volunteer to answer questions.

6. ___ cooperate by volunteering to answer questions, talking to their classmates only when it helps the class, following my directions quickly and correctly and by offering to help me or by asking me to help them.

or

___ disagree with what I say by frowning or saying that my statement was incorrect or by distorting my original statement.

7. ___ are attentive by having alert posture, looking at me, taking notes on what is said, asking broad content related questions and by answering my questions quickly and correctly.

or

___ cooperate by volunteering to answer questions, talking to their classmates only when it helps the class, following my directions quickly, and correctly, and by offering to help me or by asking me to help them.

8. ___ agree with what I say by smiling, nodding their heads or supporting what I say with more evidence.

or

___ are inattentive and ask trite, irrelevant questions, look sleepy, fidget or play with something on their desk or answer my questions slowly, incorrectly and incompletely.

9. ___ cooperate by volunteering to answer questions, talking to their classmates only when it helps the

class, following my directions quickly, and correctly, and by offering to help me or by asking me to help them.

or

___ are noncooperative or disruptive by asking trite questions to test my knowledge, talk about non-class related matters with their friends during class and don't volunteer to answer questions.

10. ___ disagree with what I say by frowning or saying that my statement was incorrect or by distorting my original statement.

or

___ are noncooperative or disruptive by asking trite questions to test my knowledge, talk about non-class related matters with their friends during class and don't volunteer to answer questions.

11. ___ are attentive by having alert posture, looking at me, taking notes on what is said, asking broad content related questions and by answering my questions quickly and correctly.

or

___ are inattentive and ask trite, irrelevant questions, look sleepy, fidget or play with something on their desk or answer my questions slowly, incorrectly and incompletely.

12. ___ agree with what I say by smiling, nodding their heads or supporting what I say with more evidence.

or

___ disagree with what I say by frowning or saying that my statement was incorrect or by distorting my original statement.

---

13. ___ are attentive by having alert posture, looking at me, taking notes on what is said, asking broad content related questions and by answering my questions quickly and correctly.

or

___ are noncooperative or disruptive by asking trite questions to test my knowledge, talk about non-class related matters with their friends during class and don't volunteer to answer questions.

---

14. ___ cooperate by volunteering to answer questions, talking to their classmates only when it helps the class, following my directions quickly, and correctly and by offering to help me or by asking me to help them.

or

___ agree with what I say by smiling, nodding their heads or supporting what I say with more evidence.

15. ___ are inattentive and ask trite, irrelevant questions, look sleepy, fidget or play with something on their desk or answer my questions slowly, incorrectly or incompletely.

or

___ disagree with what I say by frowning or saying that my statement is incorrect or by distorting my original statement.

APPENDIX G

Interaction Analysis Reliability Information on Experiment Data

Scott's "pi" coefficient has been frequently used to estimate reliability with Flanders' Interaction Analysis data. (Flanders in Amidon and Hough, 1967)

$$\pi = \frac{P_o - P_e}{1 - P_e}$$

where $P_e = \sum_{i=1}^{k} P_i^2$

Inter-rater agreement on randomly selected sections of tapes

Positive trials: $\pi = .94$
Negative trials: $\pi = .94$
Control trials: $\pi = .89$

Intra-rater agreement on randomly selected but especially fast moving tapes

(Investigator coding of tapes and consistency check 3 weeks later.)

Positive trials: $\pi = .92$
Negative trials: $\pi = .93$
Control trials: $\pi = .94$

APPENDIX G

Interaction Analysis Reliability Information on Experiment Data

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$$\text{where } P_e = \sum_{i=1}^{k} P_i^2$$

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Intra-rater agreement on randomly selected but especially fast moving tapes

(Investigator coding of tapes and consistency check 3 weeks later.)

Positive trials: $\pi = .92$
Negative trials: $\pi = .93$
Control trials: $\pi = .94$

APPENDIX H

Analysis of Variance to Estimate Reliability of the Visual Observational Schedule

Source of Variation	df	Sum Squares	Mean Squares
Between People (Trials)	6	.535	.089
Within People (Trials)	63	.575	.009
Between Judges	9	.081	.009
Residual	54	58.476	1.083
Total	69		

$$r_{10} = 1 - \frac{MS_{\text{w. people (trials)}}}{MS_{\text{between people (trials)}}} = 1 - \frac{.009127}{.089088} =$$

$$1 - .1025 = .898$$

$$r_{10} = .90$$

From Winer, 1962, p. 128

APPENDIX I

Structural Model Assumed for Repeated Measures Intermixed Latin Squares Design

$$E(X_{ijkm}) = u + O_k + S_m\,(O_k) + A_i + B_j + ABO_{ijk}' + \epsilon_{ijkm}$$

where	O_k	represents the effect of 12 orders of presentation of the four treatment conditions, i.e., positive, negative and two control.
	$S_m(O_k)$	represents the effect of the 24 subjects nested in their respective orders
	A_i	represents the effect of the four, fifteen-minute time periods
	B_j	represents the effect of the four treatments
	ABO_{ijk}'	represents that portion of the total interaction among time period, treatment and order, which is estimable from this design
	ϵ_{ijkm}	represents random error associated with observation X_{ijkm}

APPENDIX J

Analysis of Variance for a Repeated Measure Intermixed Latin Square Design (Computational Formula)

Source of Variation	df	Formula for Sum of Squares
Between Subject	23	$\frac{(\Sigma S_1)^2 + (\Sigma S_2)^2 + \ldots (\Sigma S_{24})^2}{4} - \frac{(\Sigma X)^2}{96}$
Orders (0)	11	$\frac{(\Sigma O_1)^2 + (\Sigma O_2)^2 + \ldots (\Sigma O_{12})^2}{8} - \frac{(\Sigma X)^2}{96}$
Subject within orders	12	$\frac{(\Sigma S_1)^2 + (\Sigma S_2)^2 + \ldots (\Sigma S_{24})^2}{4} - \frac{(\Sigma O_1)^2 + (\Sigma O_2)^2 + \ldots (\Sigma O_{12})^2}{8}$
Within Subject	72	$\Sigma X^2 - \frac{(\Sigma S_1)^2 + (\Sigma S_2)^2 + \ldots (\Sigma S_{24})^2}{4}$
Periods (A)	3	$\frac{(\Sigma A_1)^2 + (\Sigma A_2)^2 + \ldots (\Sigma A_4)^2}{24} - \frac{(\Sigma X)^2}{96}$
Treatments (B)	3	$\frac{(\Sigma B_1)^2 + (\Sigma B_2)^2 + \ldots (\Sigma B_4)^2}{24} - \frac{(\Sigma X)^2}{96}$
ABO'	30	$\frac{(\Sigma cell_1)^2 + (\Sigma cell_2)^2 + \ldots (\Sigma cell_{48})^2}{2} - \frac{(\Sigma X)^2}{96}$ - (Period Sum Squares + Treatment Sum of Squares + Sequence Sum of Squares) Order
Error (within)	36	Within subj. Sum Squares - (Period Sum Squares + Treatment Sum Squares + ABO' Sum Squares)
Total	95	$\Sigma X^2 - \frac{(\Sigma X)^2}{96}$

APPENDIX K

Tukey (a) Procedure Used to Compare Treatment Means

(Computational Formula)

$$q = \frac{\bar{T}_{largest} - \bar{T}_{smallest}}{\sqrt{\frac{MS\ error}{n}}}$$

n = 24 (teachers)

k = 3 treatments (positive, negative and control except when comparing controls when k = 4.)

q = studentized range statistic, Winer, Table B 4, p. 648.

APPENDIX L

Composite Interaction Analysis Matrices For All 24 Teachers

Positive Treatment Period

	1	2	3	4	5	6	7	8	9	10
1	3			5	2					1
2	1	7	40	30	55	2		10	42	3
3	1	16	20	50	63			10	26	5
4				119	45	8		30	40	15
5	3	7	9	57	3719	14	3	14	227	24
6				3	17	11	1		1	
7				2	6		1	1	6	
8		31	44	24		1	2	19	5	6
9	3	130	44	94	264	7	8	1	973	25
10		2		14		2		2	24	26
Total	11	191	174	579	4275	45	15	219	1614	105

Negative Treatment Period

	1	2	3	4	5	6	7	8	9	10
1					1					
2		2	18	32	46	2		1	31	5
3		13	2	25	37	2		2	36	
4		2		172	54	7	2	61	364	24
5	1	1	3	206	3285	19	8	20	252	42
6		1		11	23	28	10	4	37	10
7				11	20	10	35	2	21	3
8		22	25	25	14	8	3	36	9	5
9		98	49	175	328	41	42	19	1091	57
10				23	64	7	2	3	42	58
Total	1	139	97	680	3872	124	102	148	1881	204

APPENDIX L (continued)

Control a or Natural Treatment Period

	1	2	3	4	5	6	7	8	9	10
1										
2			32	14	45	1		2	35	6
3		10	9	13	67		1	2	9	
4				122	82	3	1	63	242	15
5		5	3	197	3937	9	4	26	132	34
6				5	9	12	1	2	10	1
7		1		3	9		3		1	
8		28	13	22	17	1		58	8	4
9		91	35	107	235	12	7	4	784	17
10				18	26	1		3	23	56
Total	0	135	92	501	4377	39	17	160	1244	133

Control b or Natural Treatment Period

	1	2	3	4	5	6	7	8	9	10
1									1	
2		1	31	18	42	1		8	35	5
3		8	6	14	45			2	22	
4				144	70	5		56	247	11
5		1	2	224	3795	5	2	31	223	35
6				2	8	7		3	13	1
7				3	6	3	1	1	3	
8		22	24	16	66	5	3	35	5	5
9	1	105	42	83	229	7	10	6	800	18
10		4	1	5	43	1	1	4	15	79
Total	1	141	108	509	4304	34	17	146	1354	154

APPENDIX L (Continued)

Composite Frequencies in the Visual Observational Schedule For All 24 Teachers

	Positive Treatment Period	Negative Treatment Period	Control a Treatment Period	Control b Treatment Period
Positive Nonverbal Behaviors				
Agreement	385	159	243	223
Friendly contact with students	352	231	269	208
Pay attention to students	441	343	360	344
Negative Nonverbal Behaviors				
Disagreement	18	130	32	13
Critical contact with students	18	180	21	8
Passive withdrawal from students	43	82	19	49
Lack of attention to students	46	147	75	43

APPENDIX M

Homogeneity of Variance

$$\text{Cochran C} = \frac{\text{largest variance}}{\text{sum of the variances}}$$

Critical values: Winer, Table B.8 p. 654

Between error: $C_{.95}\ (12,1) = .6020$
$C_{.99}\ (12,1) = .7175$

Within error: $C_{.95}\ (12,3) = .3733$
$C_{.99}\ (12,3) = .4469$

Interaction Analysis Variable I

Between subj. error: $C_{12,1} = .498$*

Within subj. error: $C_{12,3} = .236$*

Interaction Analysis Variable II

Between subj. error: $C_{12,1} = .225$*

Within subj. error: $C_{12,3} = .278$*

Visual Observational Schedule Variable

Between subj. error: $C_{12,1} = .315$*

Within subj. error $C_{12,3} = .300$*

* Since the observed C statistic does not exceed the .05 level critical value, the hypothesis for homogeneity of variance was not rejected.

APPENDIX N

Pupils Exercise Reinforcement, PER Observational Schedule

Nonverbal

General Directions: A trained observer will systematically scan each student's nonverbal behavior. Ordinarily, the observer will record the most prominent behavior category. However, if two or more behavior categories are evident, each will be recorded.

Behavior Categories Period __ Date ____ Time ____

Positive - Students Give Positive Reinforcement or Rewards

Encouragement or agreement (smile or nod head)

Attentiveness (eyes on teacher, alert posture, take notes on the teacher's remarks)

Cooperation (talk when it helps the class, hand up to answer questions, follow teacher's directions quickly and correctly, offer physical assistance to the teacher by giving chalk, lending book, erasing board, etc.)

Negative - Students Give Negative Reinforcement or Punishment

Disagreement (frown, shake head in disagreement)

Lack of Attention (eyes away from teacher, look out window, look to floor, slump, hold head, yawn, stretch, fidget, play with something, do non-class related work)

Lack of Cooperation (whisper or talk softly to friends, hand not up to answer questions, follow teacher's directions only slowly, incorrectly or partially, walk out of room)

APPENDIX N (Continued)

Pupils Exercise Reinforcement,
PER Observational Schedule

Verbal

General Directions: The verbal student interactions will be coded from the audio tapes of the experiments in a form similar to the Classroom Interaction Analysis data.

Students Give Positive Reinforcement or Rewards	Students Give Negative Reinforcement or Punishment
Agreement or Encouragement	Disagreement
+1 accept teacher's feelings	-1 reject teacher's feelings or behavior, laugh at teacher
+2 agrees with teacher statement, laughs with teacher	-2 disagrees with teacher statement
+3 clarifies teacher statement	-3 distorts or confuses class on teacher statement
Attentiveness	Lack of Attention
+4 ask teacher broad content related question	-4 asks teacher a trite, irrelevant question or to repeat teacher question or statement
+5 answer teacher question quickly, correctly or completely	-5 answer teacher question slowly, incorrectly or incompletely
Cooperation	Lack of Cooperation
+6 ask for teacher's help or offer teacher help	-6 ask a trite question to test the teacher's knowledge

APPENDIX O

The Analysis of Variance of the PER Observational Schedule

Effects	df	Verbal Mean Square	Verbal F	Nonverbal Mean Square	Nonverbal F
Between subj.	23	15373.93		12670.60	
Order	11	24163.28	3.3*	17697.02	2.19
Sub. within order	12	7317.03		8063.06	
Within subj.	72	63315.42		85693.03	
Periods	3	38482.57	6.1**	1627.97	.31
Treatments	3	1215747.43	191.6***	1893752.08	360.67***
ABO'	30	18918.11	2.98**	9824.39	1.87*
Error	36	6346.59		5250.74	

* Sig. at P .05
** Sig. at P .01
*** Sig. at P .001

APPENDIX O (Cont.)

Comparison Between the Treatment Means of the PER Observational Schedule

Variables	Positive		Negative		Control a		Control b		Av. Control
	Mean	sd	Mean	sd	Mean	sd	Mean	sd	Mean
Verbal	957.92	.046	473.67	.151	894.21	.13	909.42	.105	901.81
Nonverbal	968.04	.018	359.92	.141	882.63	.08	899.92	.076	891.27

Treatments	VERBAL Diff. Between Means	q	NONVERBAL Diff. Between Means	q
$\bar{X}_+ - \bar{X}_-$	484.25	29.84*	608.12	41.11*
$\bar{X}_+ - \bar{X}_c$	56.10	3.45	76.77	5.19*
$\bar{X}_c - \bar{X}_-$	428.15	26.33*	531.35	35.92*
$\bar{X}_{c_a} - \bar{X}_{c_b}$	15.21	.94	17.29	1.17

* Sig. at P.01 df = 36 n = 24 Tukey (a)

APPENDIX P

The Analysis of Variance of Verbal Teacher Behavior Ratios for Clarification, Direction and Criticism

		Clarification		Direction		Criticism	
		$\frac{3}{1-7}$		$\frac{6}{1-7}$		$\frac{7}{1-7}$	
Effects	df	Mean Square	F	Mean Square	F	Mean Square	F
Between Subj.	23	.0021		.0010		.0002	
Within Subj.	48						
Treatments	2	.0011	3.67*	.0027	13.5***	.0029	14.5***
Residual	46	.0003		.0002		.0002	

*Sig. at P.05
***Sig. at P.001

APPENDIX P (Cont.)

Comparison Between Treatment Means for Teacher Clarification, Direction and Criticism

Variables	Positive		Negative		Control	
	Mean	sd	Mean	sd	Mean	sd
Clarification	.032	.037	.019	.018	.023	.032
Direction	.008	.002	.026	.031	.008	.015
Criticism	.003	.004	.022	.022	.003	.005

Comparison of Treatment Means	Hypothesis	Clarification $\frac{3}{1-7}$		Directions $\frac{6}{1-7}$		Criticism $\frac{7}{1-7}$	
		Diff. Between Means	q	Diff. Between Means	q	Diff. Between Means	q
$\overline{X}_+, \overline{X}_-$	2	.01286	3.637*	.01814	5.885**	.01923	7.321**
$\overline{X}_+, \overline{X}_c$	3	.00923	2.611	.00059	.191	.00069	.263
$\overline{X}_c, \overline{X}_-$	4	.00363	1.027	.01873	6.077**	.01854	7.058**

* Sig. at P.05 df=46 n=24 Tukey (a)
** Sig. at P.01

APPENDIX Q

Teacher Preference for Student Behavior Choices*

* The choice in the column was the preferred item in the pair in this forced choice instrument (Appendix F).

	Coop.	Atten.	Agree	Disagree	Noncoop.	Inatten.
Cooperation		5		4	1	
Attention	17		4	8	1	
Agreement	22	18		7	1	1
Disagreement	18	14	15		2	1
Noncooperation	21	21	21	20		9
Inattention	22	22	21	21	13	
Column Totals	100	80	61	60	18	11

Matrix format suggested by Edwards, p. 34.

22 of the 24 subjects who participated in the experiment completed the questionnaire.

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